Industry Perspectives on M&S Reuse

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Agenda

- Industry Attitudes on Interoperability Standards
- Commercial Products vs. Custom Development
- M&S Reuse from Other Industries

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Industry Attitudes on Interoperability Standards

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Attitude By Industry

- Poor interoperability standards in CAD Industry
- No interoperability standards in Game industry
- Strong interoperability standards in DoD.
- Mixed interoperability standards on web.

WHY?

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CAD Industry

- Vendors have proprietary model formats
- Common translation formats inadequate (STEP, IGES)
- End users find it difficult to translate. Are inclined to stay with current CAD package
- Vendors like this barrier to switch from their products

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Game Industry

- Horrible Not-Invented-Here syndrome.
- No interoperability standards between game companies
- No interoperability standards between game projects WITHIN THE SAME COMPANY.
- Producer/Studio model makes each project a separate business, focussing on success of the one title.
- Very weak high-level corporate optimization.

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DoD M&S Industry

- Single customer speaks with (almost) one voice.
- Interoperability standards mandated.
- Resources put towards seeding market with tools.
- Unified approach to industry by monolithic customer, forces development, adoption, and proliferation of standards, enabling massive reuse.
- Successful with constructive and virtual, but no focus on CAD/CAM interoperability which SMART requires.

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Web Industry

- Excellent interoperability standards at low level (TCP/IP, HTTP)
- Nobody making money off of those standards. In fact, destroyed Novell NetWare and FTP Software.
- Companies fighting for proprietary value-add standards (Adobe PDF, RealAudio, MP3…)
- Strong motivation to “extend” open standards into proprietary ones (Microsoft with HTML and JAVA).

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Conclusions on Standards

- Strong interoperability standards enable end users to mix and match products at a very low cost
- Industry incumbents dislike standards because it eliminates proprietary advantages, reducing profit.
- DoD has unusually strong market influence. Can mandate standards and benefit more than other markets.
- For SMART, recommend similar mandate for CAD packages as HLA/SEDRIS for virtual and constructive.
- *LET INDUSTRY MAINTAIN OPEN STANDARDS!!*

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Commercial Products vs. Custom Development

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Make vs. Buy?

Why doesn't DoD write Word Processors?

- **Development and maintenance costs shouldered by another market over a larger customer base**
- **Would be much more expensive, much lower quality, and take much longer to replicate**

When Should DoD Make vs. Buy?

- **When cost of making from scratch is considerably less than buying and adapting a commercial solution**
- **For classified material or intellectual property protection**

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Benefits of Leaping to COTS as Soon as Possible

Reduction in Lifecycle Cost

- **Development and maintenance costs of COTS pieces shouldered by other customers**
- **Access to dedicated support staff, professional documentation, and continual upgrades**

Reduction in Schedule

- **Commercial-grade software components available day 1 of project**

Reduction in Risk/Increased Longevity

- **Larger customer base ensures higher likelihood of long-term existence and evolution of COTS pieces**

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Benefits of COTS Business Model

- Commercial Market is a Brutal Democracy
  - **Customers vote with their wallets**
  - **Best solutions flourish, weak competitors die**
  - **Developer directly answerable to end user**

Vs.

- Single Source Contractor Shielded from Competition
  - **Monopoly supplier answers to funding source, not end users**
  - **Competitive pressure for innovation, efficiency, gone**
  - **DoD "Freeware" paradigm funnels taxpayer money to a single supplier that gives away product for "free"**

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Effects of DoD Procurement Policy on Use of COTS

CPFF procurement process rewards contractors for developing from scratch what they could buy COTS

- **Small programs that don't have funding to rebuild everything buy COTS. Larger programs tend to "make"**
- **Saving 90% on a developmental item by buying COTS means cutting profits by 90%**
- **100% adherence to technical requirements as top priority conceals attractive tradeoffs. Program managers might like to get an 80% solution at 20% price.**

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Conclusions on Use of COTS

- Use of COTS products greatly reduces cost of procurement, risk, and schedule
- If exact COTS solution not available, DoD should start with the nearest COTS solution and augment
- DoD benefits from SBIR and other programs that seed-fund COTS products, then let free market take over
- Contracting officers should provide strong incentives to use COTS instead of developing from scratch

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M&S Reuse From Other Industries

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Reuse of Game Technology

- Leverage commercial investment
- Product requires little or no maintenance/instruction
- Product is fun; trainees will use it more
- Distribute synthetic environment training over the Internet using web technology
- DoD involvement ensures no negative training
- Cost of units brought down to mass-market levels.
- Good public relations and useful recruiting tool.

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Game Use in DoD

- *Marine Doom* experiment in combat tactics
- *MEU-2000* Marine Amphibious wargame for Marine Corps University system
- *Spearhead II* tank combat game for Armor School.
- *Fleet Command* theater Naval game in use by NSWC
- *Task Force 2010* C4I game for BCBL Leavenworth
- Extremely large manned experiments can be hosted on Internet to flesh out SMART concepts

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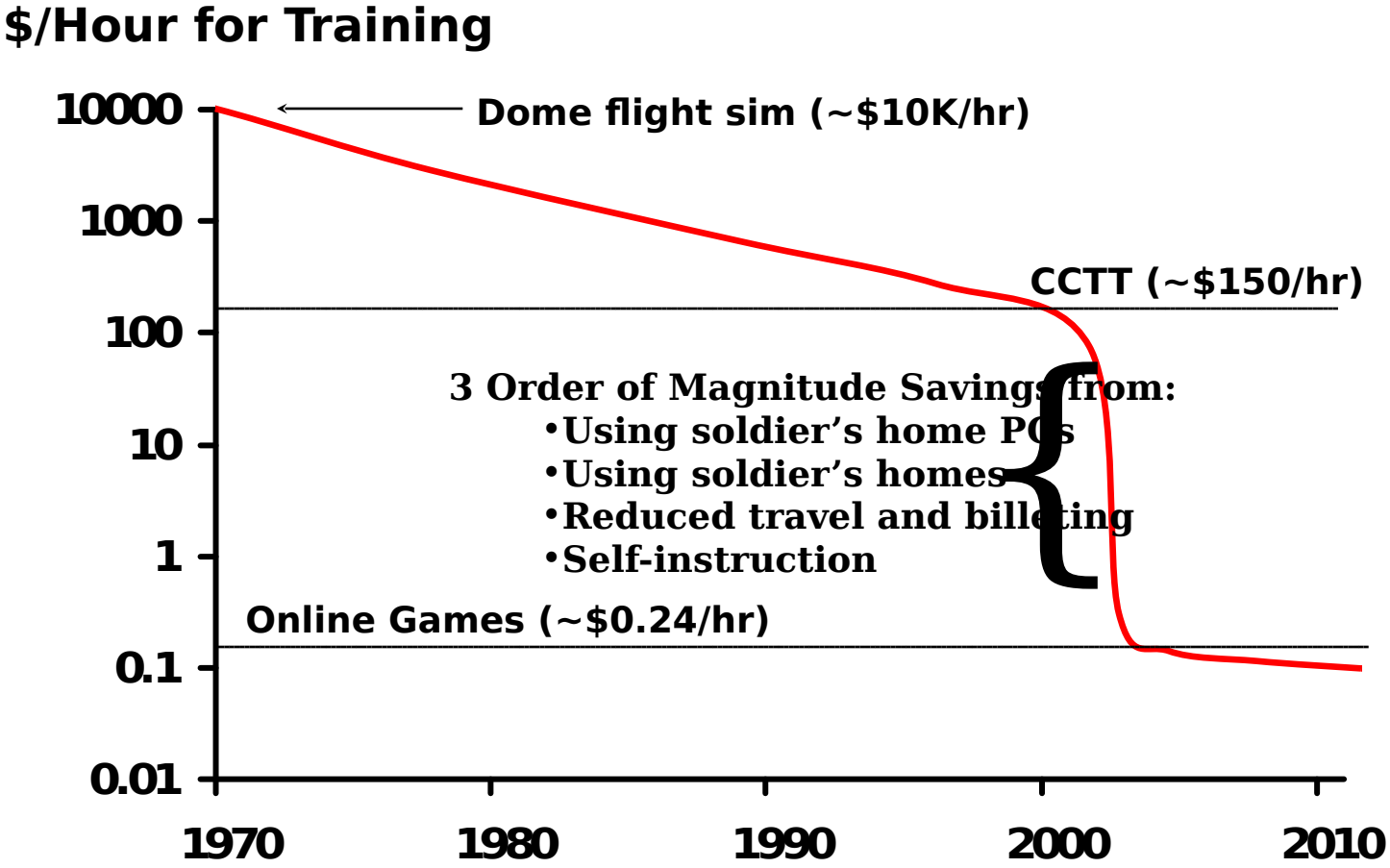
Cost Argument



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Enabling Technologies

- Advances in PC processing power
- Low-cost 3D PC-based rendering products
- High bandwidth commercial Internet connection
- Proliferation of web-based technology
- Network and terrain database standards

ALL SEED FUNDED BY DOD OVER LAST 20 YEARS, AND NOW 100% CONSUMER COTS

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CAD/CAM Reuse

- Manufacturers already using virtual prototyping for commercial goods (cars, airplanes, etc.)
- Manufacturers don’t need to examine tactical and strategic effects of their products like DoD
- Result: Rapid progress in CAD tools, but little effort invested in linking CAD to large virtual or constructive environments.

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Conclusions on Reuse

- Game industry benefited from DoD investment, can now give back extremely cost-effective COTS products
- Don’t expect 100% solution. These are toys made by toymakers. Adaptation required
- Commercial industry funding the advancement of CAD/CAM tools
- For SMART, DoD must seed-fund commercial interoperability standards between CAD tools and virtual/constructive environments

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Master Conclusions

- DoD mandated interoperability standards will make SMART possible and cost-effective
- DoD should reward COTS use in procurement
- DoD procurement process should look at 80% solution at 20% price BEFORE considering 100% solution
- SMART must look for existing innovative solutions, and seed fund only pieces that are missing

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